UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/558,384	09/05/2006	Akihiro Goto	Q91743	4167

23373 7590 09/08/2010

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
HORNING, JOEL G	

ART UNIT	PAPER NUMBER
1712	

NOTIFICATION DATE	DELIVERY MODE
09/08/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

sughrue@sughrue.com
PPROCESSING@SUGHRUE.COM
USPTO@SUGHRUE.COM

Office Action Summary	Application No.	Applicant(s)	
	10/558,384	GOTO ET AL.	
	Examiner	Art Unit	
	JOEL G. HORNING	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 July 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *90,92-115 and 144-147* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *90,92-115 and 144-147* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Application

1. By amendment filed July 1st 2010, **claims 60-89, 91 and 116-143** have been cancelled; **claims 90, 92-95, 100, 108 and 112** have been amended and **new claims 144-147** have been added. Claims 90, 92-115 and 144-147 are currently pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. **Claims 90 and 92-99** are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito (Japanese Patent Application Publication Number 05 – 148615, hereafter Saito, using the machine translation thereof) in view of Imai et al. (Japanese Patent Application Publication Number 11 – 229159, hereafter Imai, using the machine translation thereof).

Saito teaches an electrical-discharge surface-treatment method for forming a coat on a surface of a workpiece using the energy of a pulsed electrical discharge between a green discharge electrode and the workpiece (see, e.g. Paragraphs [0017] – [0019]), the electrode is formed by mixing the desired material powders, such as iron metal powder with an average diameter of 3 micrometers, and compression molding them to form a green compact, which is used as the electrode to deposit a layer, which could be used for machining, on a work piece [0027]. The coating process takes place in a medium which could be used for machining, e.g. a gas [0014]. Saito teaches that while other processes had difficultly depositing layers of about 100 micrometers thick, their process solves this problem, and so is capable of forming layers 100 micrometers thick [0006-0008].

The claim requires that the powder have an average value of particle diameter not less than 10 nanometers and not more than 1 micrometer.

While Saito does not teach a metallic compound powder having an average grain diameter in this range, it does teach that the metallic compound powder that forms the electrode has a mean particle/grain diameter of 3 micrometers [0027].

However, Imai teaches a discharge coating method in which the particle diameter of a green compact electrode is a result-effective variable that is known to influence both the thickness and quality of the film produced [0020]. Specifically, Imai teaches a relation of discharge processing energy (discharge processing condition) when using a green compact electrode comprising different particle diameters and further addresses a relation between the discharge processing

energy and a film thickness of a surface process layer. When the particle diameter is for example 1 μm, the film thickness increases with the discharge processing energy used when the particle diameter is 5 μm, but with deterioration of surface properties. Imai is explicitly teaching that the quality and thickness of a deposited film can be controlled by varying the result-effective variables of grain diameter and discharge energy (which is itself a function of pulse width and pulse current) in electrical-discharge surface-treatment methods, and that electrodes comprising metal compound powders and powders with grain diameters on the order of 1 μm are known to be used in the successful deposition of films by optimizing these variables (see Paragraphs [0014], and [0016] – [0020] and elsewhere). It has been held that, "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the present invention to have modified the method taught by Saito by using a green compact electrode that is formed with a metallic compound powder having an average value of particle diameter not less than 10 nanometers and not more than 1 micrometer as taught by Imai in order to have optimized the desired characteristics (thickness, quality) of the deposited film as taught by Imai **(claim 90).**

3. **Claim 92 and 97** further require that the electrode and work piece be arranged in a machining fluid or predetermined gas atmosphere. Saito teaches performing its

discharge process in a gas atmosphere, so the deposition components must have been arranged in that atmosphere [0014].

4. Regarding **claims 93 and 98**, Saito teaches performing the process under exemplified conditions of a width of a current pulse for the pulsed electrical discharge of 16 microseconds and a peak of the current pulse of 20 amperes (see Paragraph [0028]). Saito further teaches that appropriate pulse widths are between 5-2000 microseconds and appropriate amperages are 1-100A, which overlaps with applicant's claimed ranges. MPEP 2144.05 states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists."
5. Regarding **claims 94 and 99**, Saito teaches using an iron metal powder [0027].
6. **Claim 96** further requires that 80% of the powder in the electrode be of the powder that has an average diameter of 10-1000nm. Saito alternately teaches making the electrode from a single aluminum metal powder (100%>80%) [0024], and as discussed for claim 91, it is obvious to control the diameter of the powder particles to have average values between 10-1000nm.

   Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to make an electrode with greater than 80% of the powder having average diameters of 10-1000nm.
7. **Claim 95** requires that the (e.g. 1 micrometer) powder be not less than 10% of the powder in the electrode. Saito teaches that the large diameter powder is 50% (1:1 ratio) of the powder **(claim 95)** [0027].

8. **Claims 100, 102-108, 110-115 and 144-147** are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito.

Saito teaches an electrical-discharge surface-treatment method for forming a coat on a surface of a workpiece using the energy of a pulsed electrical discharge between a green discharge electrode and the workpiece (see, e.g. Paragraphs [0017] – [0019]), the electrode is formed by mixing the desired material powders, such as iron metal powder with an average diameter of 3 micrometers, and compression molding them to form a green compact, which is used as the electrode to deposit a layer, which could be used for machining, on a work piece [0027]. The coating process takes place in a medium which could be used for machining, e.g. a gas [0014]. Saito teaches that while other processes had difficultly depositing layers of about 100 micrometers thick, their process solves this problem, and so is capable of forming layers 100 micrometers thick [0006-0008].

The claim requires that the powder have an average value of particle diameter not less than 10 nanometers and not more than 1 micrometer.

While Saito does not teach a metallic compound powder having an average grain diameter in this range, it does teach that the metallic compound powder that forms the electrode has a mean particle/grain diameter of 3 micrometers [0027].

Saito teaches using a powder composed of a smaller powder with an average diameter of 3 micrometers and a larger powder with an average diameter of 9.8 micrometers, where the larger particle is 50% of the mixture [0027]. It is uncertain whether the percentage in Saito is a volume percent. However, MPEP 2144.05 (II)

states: "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. '[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.'" Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use a powder with 5-60vol% being the larger powder by routine experimentation **(claim 100)** or even a powder with 5-20vol% being the larger powder by routine experimentation **(claims 105 and 113)**.

9. Regarding **claims 102 and 110**, since the particles of Saito can be adequately described only by a single diameter [0027], it is readily apparent that they are substantially spherical.

Alternatively, Saito discloses the claimed invention except for that the particles are substantially spherical. It would have been an obvious matter of design choice to choose substantially spherical particles, since such a modification would have involved a mere change in the size of a component. A change of size is generally recognized as being within the ordinary level of skill in the art. *In re Dailey*, 357 F.2nd 669, 149 USPQ 1966.

10. Regarding **claims 103, 104, 111, 112 and 144-147**, Saito teaches that a wide variety of materials can be used in their method, including alloys and carbides. Hard carbides like titanium carbide can be used. For corrosion resistance, metallic materials, such as Ti, Ni or Co can be included. For higher conductivity, Fe, Co, Ni,

Cr, or Cu can be included [0016]. Saito further teaches in this paragraph that "as covering material, various metallic elements … are possible, for example, they are metal or an alloy, a nonmetallic element, ceramics, carbide, … What is necessary is in short, just to choose material due to the surface characteristic made to give." Therefore Saito is teaching that it is known to vary the components of these electrodes, in order to affect and change the surface composition and characteristics of the produced layer. Saito does not specifically teach using two powders that contain an identical component, or that they be identical, or using an alloy of Co, Ni or Fe for one of the powders.

However, from this teaching it would have been obvious to a person of ordinary skill in the art at the time of invention to use a combination of powders (e.g. TiC powder and titanium metal powder) in order to produce a desired material characteristics in the produced film (e.g. a film of good hardness and corrosion resistance) **(claims 103 and 111)**.

Furthermore, it would have been obvious to a person of ordinary skill in the art at the time of invention following the teaching of Saito to alloy a powder of Co, Ni or Fe for use as one of the powders (e.g. FeAl), in order to produce desired surface characteristics in the deposited material that would result from the chosen alloy (e.g. good conductivity and corrosion resistance) **(claim 104 and 112)**.

Furthermore, it would have been obvious to a person of ordinary skill in the art at the time of invention to use a single alloy material for both particles, where Co, Ni, or Fe is included in order to get the known desired higher conductivity that they

produce, since Saito teaches that it is within the level of ordinary skill to choose the electrode material, with an expectation of predictable results **(claims 144-147)**.

11. Regarding **claims 106 and 114** further require that the electrode and work piece be arranged in a machining fluid or predetermined gas atmosphere. Saito teaches performing its discharge process in a gas atmosphere, so the deposition components must have been arranged in that atmosphere [0014].

12. Regarding **claims 107 and 115** Saito teaches performing the process under exemplified conditions of a width of a current pulse for the pulsed electrical discharge of 16 microseconds and a peak of the current pulse of 20 amperes (see Paragraph [0028]). Saito further teaches that appropriate pulse widths are between 5-2000 microseconds and appropriate amperages are 1-100A, which overlaps with applicant's claimed ranges. MPEP 2144.05 states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists."

13. **Claim 108** has the limitations of claim 100, but further requires that there be a distribution of smaller diameter powder be not more than 3 micrometers in diameter and that the average diameter of the larger diameter powder be not less than 5 micrometers in diameter. As discussed for claim 100, Saito teaches this.

14. **Claims 101 and 109** are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito in view of Imai (Japanese Patent Application Publication Number 11 – 229159, hereafter Imai, using the machine translation thereof) further in view of Koizumi et al (EP 1035231, hereafter referred to as Koizumi).

Saito in view of Imai does not specifically teach that the smaller powder is refined by grinding.

However, Koizumi is also directed towards an electrical-discharge surface-treatment method for forming a coat on a surface of a workpiece using the energy of a pulsed electrical discharge between a green discharge electrode and the workpiece (abstract). It teaches that the powders used can be suitably formed by grinding (pulverizing) them [0031]. Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to grind the powder in order to produce the desired size of powder particle, since it was a method known to be suitable for the refining of powders to be used in such green discharge electrodes and would produce predictable results **(claims 101 and 109)**.

15. **Claims 144-147** are alternately rejected under 35 U.S.C. 103(a) as being unpatentable over Saito, as applied to claim 100, in view of Liu (Powder Technology 126 (2002) 283-296).

As discussed above in the previous rejections of claims 144-147, it is obvious to make the electrode of a single material, including, specifically, and alloy where Co, Ni, or Fe is included in order to get the known desired higher conductivity that they produce, since Saito teaches that it is within the level of ordinary skill to choose the electrode material, with an expectation of predictable results.

However, though it is obvious from the teaching of Saito to use the same material for both sizes of particles, Saito does not make it perfectly clear what effect having different sized particles has on the electrode.

However, Liu is also directed towards forming packed mixtures of particles and it teaches that the particle size distribution affects the packing efficiency of the powder, which in turn has a significant effect upon the pressing efficiency of the powder during packing, shrinkage and the resulting density of the pack (section 1). In particular, it teaches that using a powder mixture of particles of two different sizes allows the maximum possible packing efficiency to increase, allowing for much denser packing (figure 1).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to utilize a binary size distribution for the powders of Saito (such as Saito itself uses) in order to increase the ability of the powder to pack. Such a person would be motivated to do so in order to produce good packing while using lower pressures or in order to increase the overall density of the packed electrode. Such a person would do so with the expectation of predictable results **(claims 144-147)**.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. **Claims 90-99** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent No. 7641945 (hereafter referred to as '945). Although the conflicting claims are not identical, they are not patentably distinct from each other because it teaches an electrical-discharge surface treatment using a green electrode that has been compressed formed of a metallic powder or metallic compound powder with average particle diameters that are not greater than a micrometer (overlapping with the claimed range). The discharge treatment forms a film of a machining material on a work piece surface. Since there must be a gap between the electrode and the work piece to form the discharge, there must be a machining medium to fill it. This process is capable of forming films 100 micrometers in diameter. From the claims the use of a single powder to form the electrode is clearly envisaged, so the electrode will be uniform in composition and the powder will certainly be more than 10% of the powder. The current pulse is not more than 70 microseconds and the current is less than 30 amps.

17. **Claims 100, 102-108, 110-115 and 144-147** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent No. 7641945 in view of in view of Saito.

'945 does not teach using different powders of the required diameters, compositions and proportions. However, as discussed in the rejection of claims 100 previously, Saito makes these limitations obvious, so it would be obvious to a person of ordinary skill in the art to modify '945 to produce these limitations in view of Saito **(claims 100, 102-106, 108, 110-114 and 144-147)**. '945 further teaches performing the discharge with a pulse width which is less than 70 microseconds and at less than 30 amps **(claims 107 and 115)**.

18. **Claims 101 and 109** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent No. 7641945 in view of in view of Saito in view of Koizumi.

'945 in view of Saito does not teach grinding the powders to produce the desired refined size, however, as discussed in the rejection of these claims above, Koizumi teaches grinding the powders and so renders it obvious to a person of ordinary skill in the art at the time of invention to use powders that have been ground, since they were known to be suitable and would produce predictable results.

19. **Claims 100, 102-106, 108, 110-114 and 144-147** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 76-78, 105 and 106 of copending Application No.10/559427 (hereafter referred to as '427) in view of Saito. Although the conflicting claims are not identical,

they are not patentably distinct from each other because these claims teach the limitations of claims 90 and 95 except for explicitly stating that the electrode is uniform, the particle diameter is 10-3000nm in diameter and that the process is capable of forming 100micron thick films.

This process is capable of forming films 100 micrometers in diameter. From the claims the use of a single powder to form the electrode is clearly envisaged, so the electrode will be uniform in composition and the powder will certainly be more than 10% of the powder.

'427 does not teach using different powders of the required diameters, compositions and proportions. However, as discussed in the rejection of claims 100 previously, Saito makes these limitations obvious, so it would be obvious to a person of ordinary skill in the art at the time of invention to modify '427 to produce these limitations in view of Saito **(claims 100, 102-106, 108, 110-114 and 144-147)**. As discussed in the prior art rejection of claims 107 and 115, Saito teaches performing the discharge with a pulse width which is less than 70 microseconds and at less than 30 amps as appropriate for this process, so it would have been obvious to a person of ordinary skill in the art at the time of invention to modify '427 to use these parameters **(claims 107 and 115)**.

20. **Claims 90 and 92-99** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 76-78, 105 and 106 of copending Application No.10/559427 (hereafter referred to as '427) in view of Saito further in view of Imai.

‘427 in view of Saito does not teach using powder with average size particles 10-1000nm in diameter, however, as discussed in the prior art rejection of claim 91 previously, Imai teaches that diameter of the particles is a result effective variable which should be optimized in order to produce the desired thickness and quality of the resulting film.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to optimize the average particle size of the powder of ‘427 in view of Saito to be within the claimed range by routine optimization in order to produce the desired quality and thickness of the film **(claim 90 and 95)**. ‘427 does not specifically teach using more than 80% of the powder in the claimed range. However, as discussed in the previous rejection of 96, Saito teaches using a single powder as a suitable electrode for forming desirable films, so it would have been obvious ot a person of ordinary skill in the art at the time of invention to modify the process of '427 to use a single powder electrode, which would then have the required diameter powder to be more than 80% of the powder, since it was a known desirable use for the process which would produce predictable results **(claim 96)**. Regarding **claims 92 and 97**, ‘427 does not teach that their medium is a machining fluid or a gas atmosphere. However, as discussed previously in the prior art rejection of claims 92 and 97, Saito teaches that a gas atmosphere is a suitable environment in which to perform this process. Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use a gas atmosphere as the machining medium, since it was known to be suitable for that purpose and would

produce predictable results. Regarding **claims 93 and 98,** '427 does not teach using this deposition parameters, however as discussed in the prior art rejection of claims 107 and 115, Saito teaches performing the discharge with a pulse width which is less than 70 microseconds and at less than 30 amps as appropriate for this process, so it would have been obvious to a person of ordinary skill in the art at the time of invention to modify '427 to use these parameters. Regarding **claims 94 and 99**, the powder of '427 is taught to be a metal.

21. **Claims 101 and 109** are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 76-78, 105 and 106 of copending Application No.10/559427 (hereafter referred to as '427) in view of Saito in view of Koizumi.

'427 in view of Saito does not teach grinding the powders to produce the desired refined size, however, as discussed in the rejection of these claims above, Koizumi teaches grinding the powders and so renders it obvious to a person of ordinary skill in the art at the time of invention to use powders that have been ground, since they were known to be suitable and would produce predictable results.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

22. **Claims 100, 102-106, 108, 110-114 and 144-147** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 46, 51 and 52 of U.S. Patent No. 7537808 (which was previously used in the provisional double-patenting rejection before it issued as application 10/516506) in

view of in view of Saito. Although the conflicting claims are not identical, they are not patentably distinct from each other because these claims teach the limitations of claims 90 and 95, the particle diameter is 10-3000nm in diameter and that the process is capable of forming 100 micron thick films.

This process is capable of forming films 100 micrometers in diameter.

'808 does not teach using different powders of the required diameters, compositions and proportions. However, as discussed in the prior art rejection of claims 100 previously, Saito makes these limitations obvious, so it would be obvious to a person of ordinary skill in the art at the time of invention to modify '808 to produce these limitations in view of Saito **(claims 100, 102-106, 108, 110-114 and 144-147)**. As discussed in the prior art rejection of claims 107 and 115, Saito teaches performing the discharge with a pulse width which is less than 70 microseconds and at less than 30 amps as appropriate for this process, so it would have been obvious to a person of ordinary skill in the art at the time of invention to modify '506 to use these parameters **(claims 107 and 115)**.

23. **Claims 90 and 92-99** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 46, 51 and 52 of U.S. Patent No. 7537808 (which was previously used in the provisional double-patenting rejection before it issued as application 10/516506) in view of in view of Saito further in view of Imai.

'808 in view of Saito does not teach using powder with average size particles 10-1000nm in diameter, however, as discussed in the prior art rejection of claim 90

previously, Imai teaches that diameter of the particles is a result effective variable which should be optimized in order to produce the desired thickness and quality of the resulting film.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to optimize the average particle size of the powder of '808 in view of Saito to be within the claimed range by routine optimization in order to produce the desired quality and thickness of the film **(claim 90 and 95)**. '808 does not specifically teach using more than 80% of the powder in the claimed range. However, as discussed in the previous rejection of 96, Saito teaches using a single powder as a suitable electrode for forming desirable films, so it would have been obvious to a person of ordinary skill in the art at the time of invention to modify the process of '808 to use a single powder electrode, which would then have the required diameter powder to be more than 80% of the powder, since it was a known desirable use for the process which would produce predictable results **(claim 96)**. Regarding **claims 92 and 97**, '808 does not teach that their medium is a machining fluid or a gas atmosphere. However, as discussed previously in the prior art rejection of claims 92 and 97, Saito teaches that a gas atmosphere is a suitable environment in which to perform this process. Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use a gas atmosphere as the machining medium, since it was known to be suitable for that purpose and would produce predictable results. Regarding **claims 93 and 98,** '808 does not teach using this deposition parameters, however as discussed in the prior art rejection of

claims 107 and 115, Saito teaches performing the discharge with a pulse width which is less than 70 microseconds and at less than 30 amps as appropriate for this process, so it would have been obvious to a person of ordinary skill in the art at the time of invention to modify '808 to use these parameters. Regarding **claims 94 and 99**, the powder of '808 is taught to be a metal.

24. **Claims 101 and 109** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 46, 51 and 52 of U.S. Patent No. 7537808 (which was previously used in the provisional double-patenting rejection before it issued as application 10/516506) in view of in view of Saito in view of Koizumi.

'808 in view of Saito does not teach grinding the powders to produce the desired refined size, however, as discussed in the rejection of these claims above, Koizumi teaches grinding the powders and so renders it obvious to a person of ordinary skill in the art at the time of invention to use powders that have been ground, since they were known to be suitable and would produce predictable results.

Response to Amendment

25. In response to applicant's amendment of July 1st, 2010, the 112 2nd rejections of claims 90-115 have been withdrawn.

Response to Arguments

26. Applicant's arguments with respect to claims 90, 92-115 and 144-147 have been considered but are not convincing in view of the new ground(s) of rejection necessitated by amendment.

In response to applicant's arguments against the 102(b) rejection utilizing the teaching of Saito, applicant's amendment to the claims incorporating a new limitation has overcome the anticipation rejection. However, the claims are still rejected as Saito in view of Imai.

In response to applicant's argument that Imai teaches away from using particle diameters of around 1 micrometer because under certain discharge energies, particle diameters of about 1 micrometer produce unsuitable planarity. Applicant is correct that Imai teaches that certain energy levels with be inappropriate for all particle diameters. However, Imai teaches that you choose the appropriate energy levels for the particle size that you are using. In the case of particles about 1 micrometer in diameter, suitable film planarity can be produced with energies of E0-E1 (as shown in figure 5) should be chosen to get good properties [0020]. This is not a teaching away from using particle sizes that are not 5 micrometers, it is a teaching that the particle size is a processing variable and it is a variable that will affect other parameters of the process, which a practitioner will be able to optimize in order to produce a desirable result. It is a result effective variable.

Applicant's argues that the concentration of large particles is critical in the claimed process effectively because a large concentration of large particles requires an increase in the discharge pulse current used. This is the same effect taught by Imai (larger particles require higher currents), so it is not a convincing distinction over the art of record. It is just a motivation to optimize the particle size for the desired processing current.

Applicant argues that the spherical shape of the particles is not a design choice, applicant cites a sixth embodiment wherein "it is possible to form a dense electrode when it is molded from a spherical powder as opposed to other shapes." First, applicant cites this as being a feature of claim 103, but it is claim 102 that recites "wherein the large-diameter powder has a substantially spherical shape." Second, this claim does not actually require that the powder be spherical, so any unexpected property of specifically spherical particles would not be convincing for this claim (because it does not require them). Third, embodiment 6 actually teaches an embodiment where the powder is *not spherical*, but produces electrodes with better density and uniformity than spherical powder produces (page 44, lines 3-18). Applicant's argument is not convincing.

Applicant states that a claim (applicant states claim 104, but it is claim 103) requires that the materials of the large and small particles have an identical component. Applicant notes that Saito does not exemplify using an identical component for both the large and the small diameter particles, from which applicant concludes that is would not be obvious to do so. However, as examiner has cited, Saito teaches that the practitioner is capable of selecting appropriate materials for the electrode powders in order to produce the desired properties in the resulting film. From this teaching , it would have been obvious to a person of ordinary skill in the art at the time of invention to select materials that share a component, or even identical materials for the different particles, because it is with the level of ordinary skill to select these materials from those known to be useful in order to produce

desired properties in the resulting film. Applicant has not provided any evidence of unexpected results produced when using an identical component for both particles, so the argument is not convincing.

In response to applicants arguments against the double patenting rejection of claims 90-99 over US patent 7641945, the '945 patent requires that the electrode be a compact (that is, it has been compressed) and the particle size ranges overlap, making the claimed ranges obvious, and applicant's claim does not require that the films be not less than 100 micrometers, only that it be capable of forming such films, which '945 is certainly capable of doing. Similar arguments hold for the rejection utilizing application 10/559427 and 10/516506 application (now issued as 7537808).

Conclusion

No current claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL G. HORNING whose telephone number is (571) 270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. G. H./
Examiner, Art Unit 1712

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1712